

## REMARKS

The official action of 25 February 2009 has been carefully considered and reconsideration of the application as amended is respectfully requested.

Claim 1 has been amended to recite that the liquid and membrane electrolytes are distinct electrolytes as shown, for example, in Fig. 1 of the drawing. This amendment simply clarifies what was meant by the separate recitation of these electrolytes in the claims as filed and does not narrow the scope of the claims. New claim 27 has been added more completely to define the subject matter which Applicants regard as their invention. This claim recites the disposition of the two (2) electrodes in accordance with Fig. 1 of the drawing.

Claim 13 has been amended to make clear that the anode catalyst comprises an alloy of nickel and ruthenium. One of skill in the art would understand this to be what is meant by the term: “nickel-ruthenium system” in the specification as filed (see e.g., page 3, line 14 and original claim 13) since the term has a well defined meaning in the art. See Nash, “The Ni-Ru (Nickel-Ruthenium) system”, Journal of Phase Equilibria, Volume 7, Number 2 / April, 1986 at Fig. 1 (copy of figure submitted herewith). This amendment is respectfully believed to remove the basis for the Section 112 rejection to claim 13.

With respect to the Section 112 rejection to claim 17, Applicants respectfully traverse the rejection on the basis that the claim recites that the pyropolymers of N<sub>4</sub>-complexes are on a **carbon carrier** (not on **carbon** as stated by the Examiner). One of skill in the art would understand what is meant by “carbon carrier” as can be seen from the use of that term in the **claims** of at least 154 issued US patents (see results of USPTO full text database search submitted herewith).

In view of the above, Applicants respectfully submit that all claims of record are sufficiently definite to satisfy the dictates of 35 USC 112, second paragraph, and that the

Section 112 rejections of record should be withdrawn.

Certain claims stand rejected under 35 USC 102(b) as allegedly being anticipated by Gregory. Other claims stand rejected as allegedly being unpatentable over Gregory in view of one or more of the secondary references cited at paragraphs 6-15 of the official action. Applicants respectfully traverse these rejections.

The sole independent claim of this application (claim 1) recites an alcohol-air fuel cell comprising (a) an anode chamber with a **liquid catalytically active** anode (wherein the anode is suitable for operation with a liquid (i.e., alcohol) fuel), (b) an air chamber with a catalytically active gas-diffusion cathode, and (c) an electrolyte chamber with both **a liquid-electrolyte** and **a membrane electrolyte**. These features are not shown or suggested by the cited references, either alone or in proper combination, as next discussed.

First, Applicants respectfully note that the primary reference, Gregory, is concerned with **improved electrodes** which can be used in any electrochemical device, including but not limited to fuel cells. See Gregory at column 1, lines 20-30. For convenience, Gregory describes the electrodes with reference to fuel cells **generally** (see column 2, line 30 to column 3, line 3) but, with the exceptions described next, Gregory does not describe any specific fuel cells. The exceptions are (a) the fuel cell depicted in Fig. 5 and (b) the fuel cell described in the Gregory example. Both of these fuel cells use a gaseous hydrogen fuel. See column 5, lines 47-52 (“The anode was fed with pure hydrogen. . . .”); and Fig. 5 (compare reference numeral 9, using drawing symbol to depict electrolyte as a liquid, with reference numeral 2, depicting fuel compartment without liquid drawing symbol).

Thus, although Gregory does not limit the use of his electrodes to a specific type of fuel cell, the only specific fuel cell he describes is one that uses a reactant gas. See, also, Gregory at column 2, lines 22-25 (“It is another object of this invention to provide a

fuel cell electrode comprising a hydrophobic surface for contacting **the reactant gas** with said hydrophobic surface being electronically conductive.”). To function, the anodes in the fuel cells described in Gregory require a gaseous fuel. Gregory does **not** describe a fuel cell comprising a **liquid catalytically active** anode that is effective for oxidation of a liquid fuel such as an alcohol.

Moreover, the fuel cells described in Gregory do **not** comprise an electrolyte chamber containing **two distinct electrolytes**: a liquid electrolyte and a membrane electrolyte. Gregory discloses a liquid electrolyte (Fig. 5) or a liquid electrolyte in an asbestos matrix (col. 5, lines 50-52), but it does not show or suggest a fuel cell comprising both a liquid electrolyte **and** a membrane electrolyte.

Accordingly, and since the cited secondary references cannot supplement these deficiencies in the primary reference, the references cannot be considered to anticipate or to render obvious the claimed invention, either alone or in combination. Indeed, since the only specific fuel cells described in Gregory use gaseous reactants, there would not have been any motivation or reason to modify **these** fuel cells to arrive at the claimed invention, which requires anodes that are effective to oxidize a liquid (alcohol). See MPEP 2143.01(VI) (“If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie obvious*.”).

Similarly, since the principle of operation of the electrodes in Gregory requires that the electrodes have the specific structure described therein, there would not have been any motivation or reason to modify the Gregory electrodes to arrive at the electrodes defined in, for example, claims 6-13 and 20-26.

In view of the above, Applicants respectfully submit that the prior art rejections and all other rejections and objections of record have been overcome and that the application is now in allowable form. An early notice of allowance is earnestly solicited

and is believed to be fully warranted.

Respectfully submitted,

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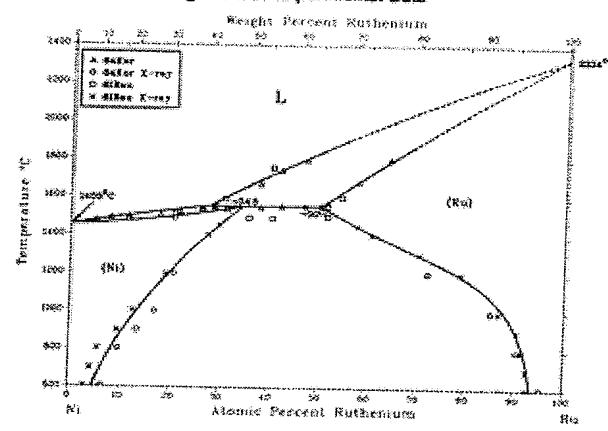
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# The Ni-Ru (Nickel-Ruthenium) System

58.69 101.07

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Fig. 1 Assessed Ni-Ru Phase Diagram with Experimental Data



P. Nash, 1986.